

Catholic high

Questions 1 to 10 carry 1 mark each. Questions 11 to 18 carry 2 marks each. For each question, four options are given. One of them is the correct answer. Make your choice (1, 2, 3 or 4). Shade the oval (1, 2, 3 or 4) on the Optical Answer Sheet. All diagrams are not drawn to scale. (26 marks)

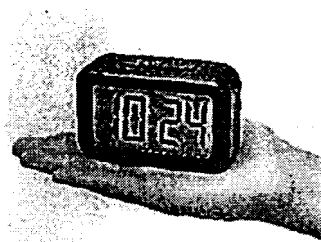
1. Which of the following is two hundred and fifty-six thousand and thirty in numerals?

- (1) 25 630
- (2) 56 230
- (3) 256 030
- (4) 560 230

2. A factory produces a certain number of toys in a month. When rounded to the nearest thousand, the number of toys is 56 000. Which one of the following could be the actual number of toys produced?

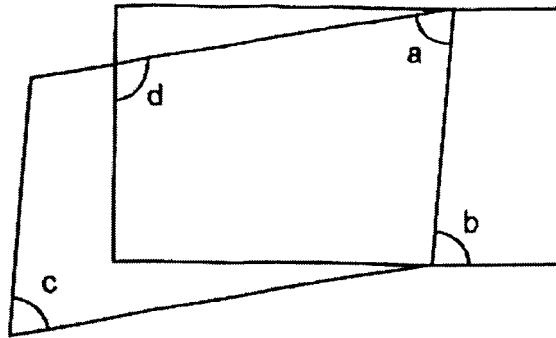
- (1) 55 389
- (2) 55 689
- (3) 56 501
- (4) 56 789

3. Which of the following is the likely mass of an alarm clock?



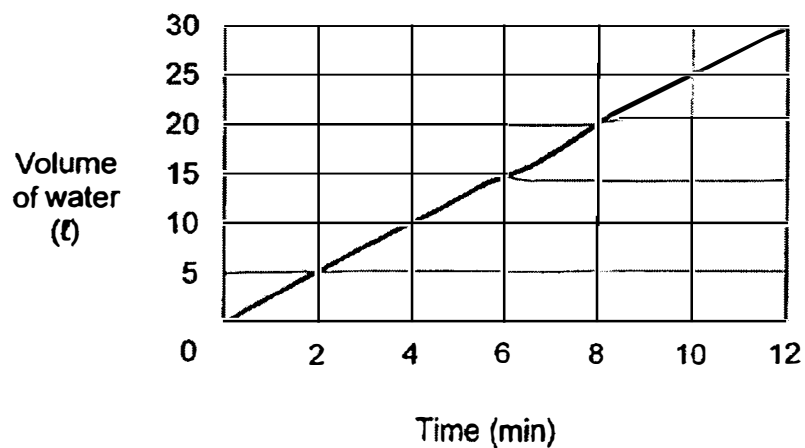
- (1) 0.2 kg
- (2) 2 kg
- (3) 0.02 kg
- (4) 0.002 kg

4. Which of the angles is an obtuse angle?



- (1) $\angle a$
- (2) $\angle b$
- (3) $\angle c$
- (4) $\angle d$

-
5. The line graph represents the rate of water from a flowing tap.



At this rate, how many litres of water will flow from the tap in 42 minutes?

- (1) 42 l
- (2) 75 l
- (3) 105 l
- (4) 180 l

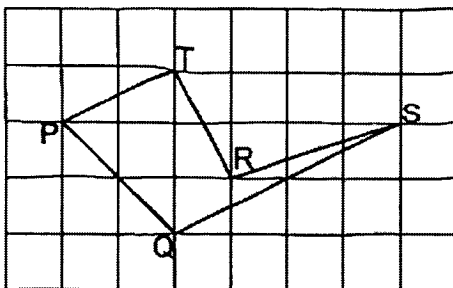
6. What is the value of $70 \div 3500$?

- (1) 5
 - (2) 50
 - (3) 0.2
 - (4) 0.02
-

7. Which of the following fractions is the closest to $\frac{1}{2}$?

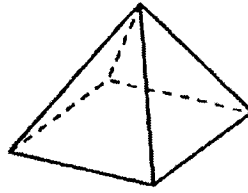
- (1) $\frac{3}{7}$
 - (2) $\frac{3}{5}$
 - (3) $\frac{5}{8}$
 - (4) $\frac{7}{12}$
-

8. In the square grid, which two lines are perpendicular to each other?



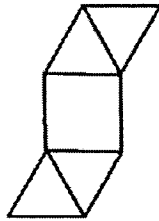
- (1) PT and QS
 - (2) PQ and QS
 - (3) TR and PT
 - (4) TR and RS
-

9. The figure shows a pyramid.

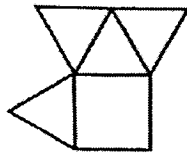


Which one of the following is **not** a net of the pyramid?

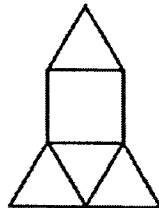
(1)



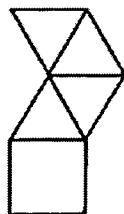
(2)



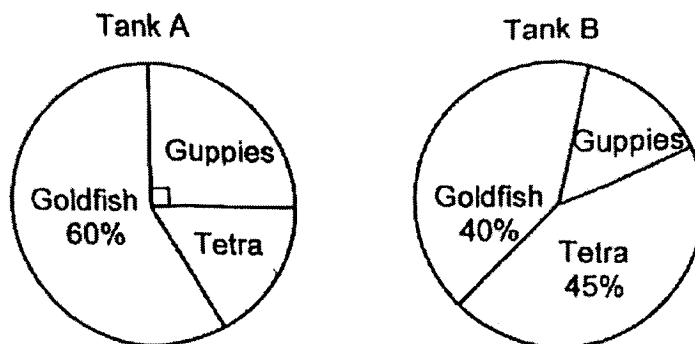
(3)



(4)



10. The ratio of the number of fishes in tank A to the number of fishes in tank B is 2 : 1. The pie charts show the different types of fish in each tank.



What is the ratio of the number of guppies in tank A to the number of guppies in tank B?

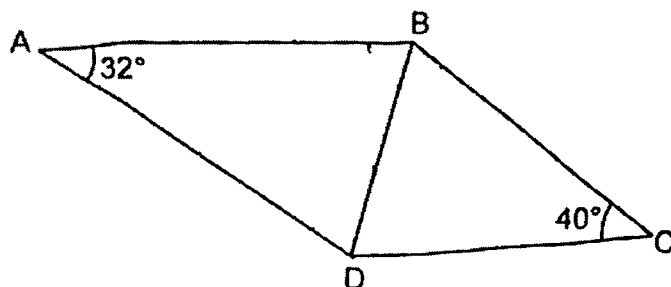
- (1) 3 : 5
- (2) 5 : 3
- (3) 3 : 10
- (4) 10 : 3

11. Arrange the following volumes from the smallest to the largest.

2.5 l	$2\frac{1}{5}$ l	2 l 50 ml
-------	------------------	-----------

- | | <u>smallest</u> | | <u>largest</u> |
|-----|------------------|------------------|------------------|
| (1) | $2\frac{1}{5}$ l | 2 l 50 ml , | 2.5 l |
| (2) | 2.5 l | $2\frac{1}{5}$ l | 2 l 50 ml |
| (3) | 2 l 50 ml , | $2\frac{1}{5}$ l | 2.5 l |
| (4) | 2 l 50 ml , | 2.5 l | $2\frac{1}{5}$ l |

12. ABCD is a trapezium. AB is parallel to CD. AB is equal to AD. $\angle DAB = 32^\circ$ and $\angle BCD = 40^\circ$. Find $\angle DBC$.



- (1) 66°
(2) 70°
(3) 74°
(4) 88°
-
13. Dave packed apples and guavas into box X and box Y. Each box contained both apples and guavas. $\frac{2}{5}$ of the fruits were in box X and the rest were in box Y. $\frac{1}{12}$ of the fruits in box X were apples. $\frac{1}{2}$ of the fruits packed were guavas. What fraction of the fruits in box Y were guavas?

- (1) $\frac{2}{15}$
(2) $\frac{2}{9}$
(3) $\frac{4}{5}$
(4) $\frac{7}{9}$
-

14. Warhida had \$20. She bought 1 plate and 1 bowl. A bowl cost \$2 less than a plate. After making the purchase, she had \$a left. Express the cost of 1 bowl in terms of a.

- (1) $\$ \left(\frac{22+a}{2} \right)$
 (2) $\$ \left(\frac{22-a}{2} \right)$
 (3) $\$ \left(\frac{20-a}{2} \right)$
 (4) $\$ \left(\frac{18-a}{2} \right)$

15. Figure 1 shows a square piece of paper, JKLM. A, B and C are the midpoints of each side of the paper. Triangle AKC and half of rectangle JABM are cut from the square piece of paper as shown in Figure 2.

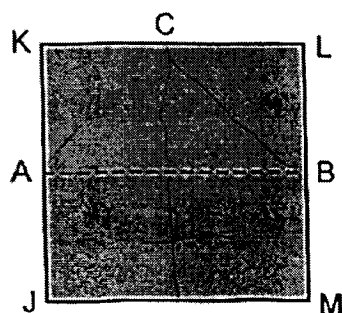


Figure 1

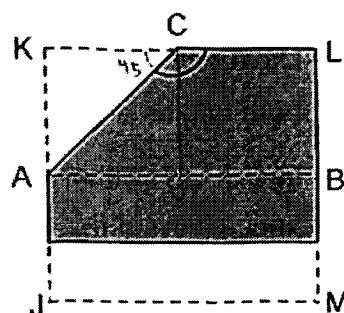


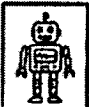
Figure 2

Which of the following statement(s) is/are true?

- A. $\angle ACL = 135^\circ$
 B. The piece of paper left in figure 2 is a trapezium.
 C. Triangle AKC has the same area as half of rectangle JABM.
- (1) A only
 (2) A and B only
 (3) A and C only
 (4) A, B and C

16. The ratio of Charlie's age to John's age is 3 : 1 now. In 4 years' time, the sum of their ages will be 48 years old. How many years old is John now?
- (1) 10 years
(2) 11 years
(3) 14 years
(4) 15 years
-

17. The table shows the mass of a basket with different toys: a toy car, a robot, and a teddy bear.

			Mass (g)
Basket	+	 	200
Basket	+	 	240
Basket	+	 	280
Basket	+	  	340

What is the mass of the empty basket?

- (1) 140 g
(2) 100 g
(3) 60 g
(4) 40 g
-

18. The table shows the postage rates for sending a parcel overseas.

First 500 g	?
Every additional 250 g or less	\$1.50

Joe sent a parcel with a mass of 1.8 kg. He paid \$11. What was the postage rate for the first 500 g of a parcel?

- (1) \$1.00
- (2) \$2.00
- (3) \$3.20
- (4) \$3.50

END OF BOOKLET A

Questions 19 to 30 carry 2 marks each. Write your answers in the spaces provided. For questions which require units, give your answers in the units stated. All diagrams are not drawn to scale. (24 marks)

19.



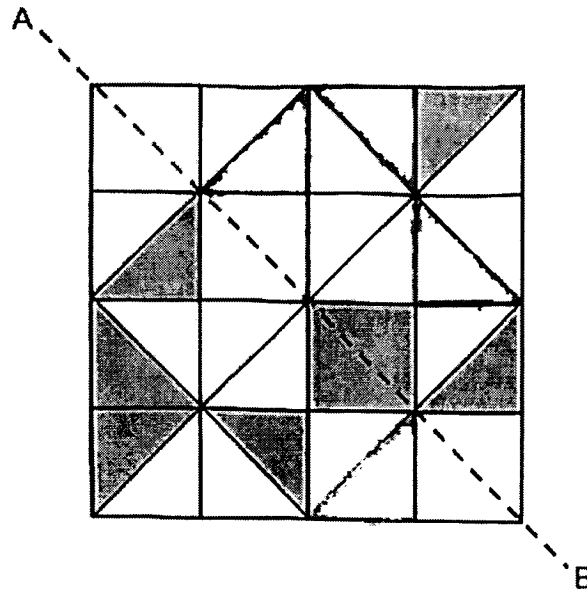
Ms Tan took home 40 muffins. She paid \$18 less with the special offer. What was the price of a muffin?

Ans: \$ _____

20. Patrick bought 300 cm of ribbon and used some of it for a project. He had 165 cm of ribbon left. What was the percentage decrease in the length of the ribbon?

Ans: _____ %

21. The figure is made up of identical triangles. 8 of them are shaded. Shade 4 triangles to form a symmetric figure with AB as the line of symmetry.

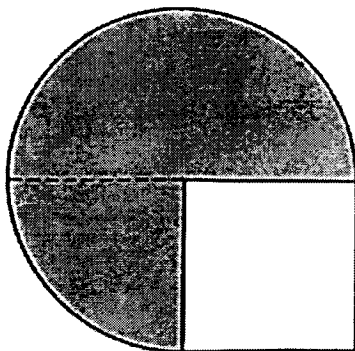


Do not write
in this space



22. The figure is made up of a square of side 7 cm, a semicircle and a quarter circle of the same radius. What is the area of the shaded figure?

(Take $\pi = \frac{22}{7}$)



Ans: _____ cm²



23. In a jar, there are three types of nuts: almonds, cashews and peanuts. The ratio of the number of almonds to cashews is $13 : 7$. The ratio of the number of peanuts to the total number of almonds and cashews is $3 : 4$. What is the ratio of the number of almonds to cashews to peanuts?

Ans: _____

24. The first 16 numbers of a number pattern are given below.

4 0 3 1 0 4 0 3 1 0 4 0 3 1 0 4

The sum of all the numbers in the pattern is 303. How many digit '0' are there in the pattern?

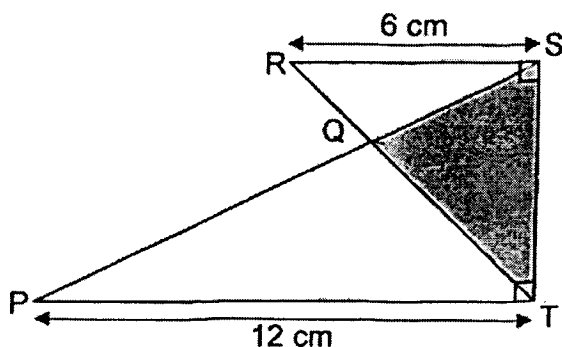
Ans: _____

25. Mrs Moliah used $\frac{1}{12}$ of her beads and gave $\frac{1}{4}$ of her beads to her friend. She placed the rest of her beads into boxes. Each box contained $\frac{1}{6}$ of the beads. How many boxes did she use?

Do not wr
in this spæ

Ans: _____

26. Figure PQRST has an area of 42 cm^2 . PQS and RQT are straight lines. $RS = ST$. Find the area of the shaded triangle QST.



Ans: _____ cm^2

27. A librarian arranged some books on three shelves. The first shelf had $12w$ books. The second shelf had $4w$ fewer books than the first shelf. The third shelf had 40 more books than the second shelf.

(a) Find the number of books on the third shelf.
Give your answer in terms of w in the simplest form.

Ans: (a) _____

(b) There were 160 books on the third shelf. Find the value of w .

Ans: (b) _____

28.

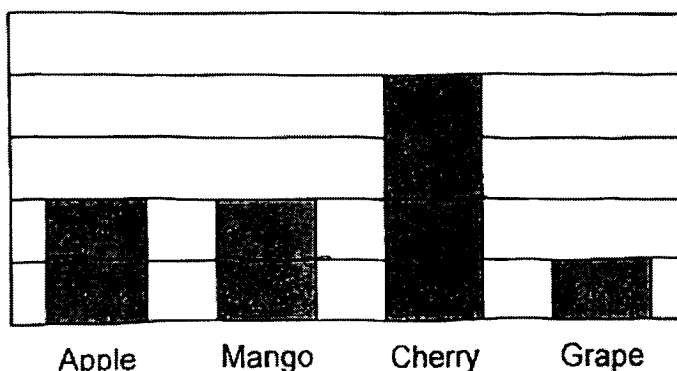
Judy had 16 stickers more than Lindy at first. After Judy gave 26 stickers to Lindy, Lindy had 5 times as many stickers as Judy. How many stickers did Lindy have at first?

Do not write in this space

Ans: _____

29.

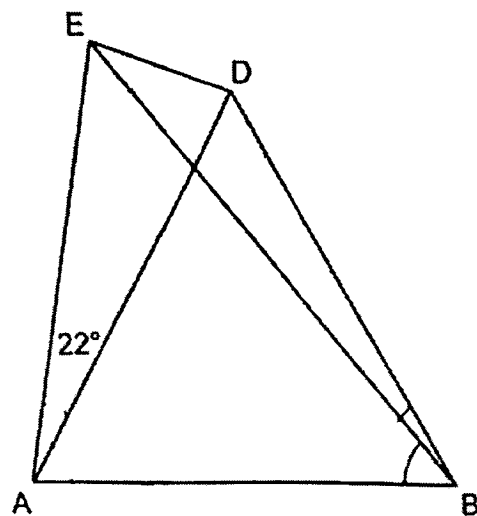
The bar graph shows the favourite fruits of a total of 153 boys and girls. Each pupil chose only one type of fruit in the survey. 50% of each group of children who had chosen Apple, Mango and Cherry as their favourite fruit were girls. No girls chose grape as their favourite fruit.



Each statement is either true, false or not possible to tell from the information given. Put a tick (✓) to indicate your answer.

Statement	True	False	Not possible to tell
(a) 68 pupils chose cherry as their favourite fruit.			
(b) There were more girls than boys in the survey.			

30. In the figure, triangle ABD is an equilateral triangle. $AD = AE$ and $\angle DAE = 22^\circ$. Find $\angle ABE$.



Ans: _____°

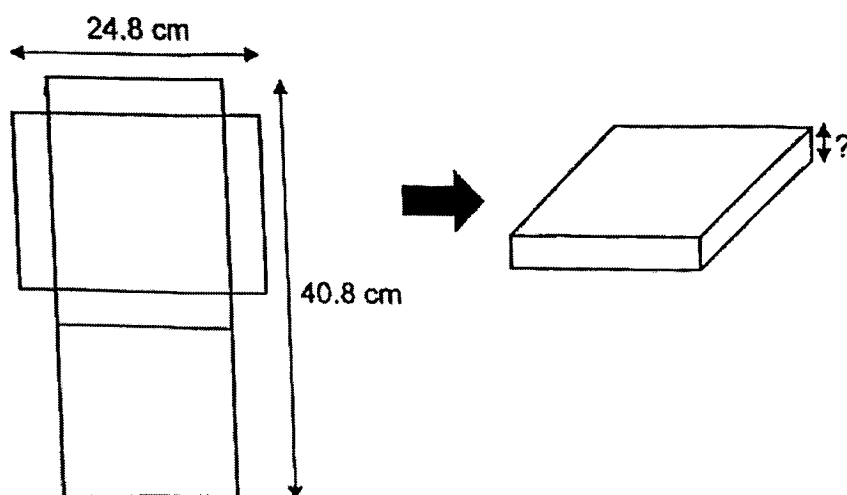
Total marks for questions 19 to 30

END OF BOOKLET B

24

Questions 1 to 5 carry 2 marks each. Show your working clearly in the space below each question and write your answers in the spaces provided. For questions which require units, give your answers in the units stated. All diagrams are not drawn to scale. (10 marks)

1. The diagram shows the net of a cuboid. It is made up of 2 identical squares and 4 identical rectangles. What is the height of the cuboid?



Ans: _____ cm

2. Find the sum of all the common factors of 16 and 24.

Ans: _____

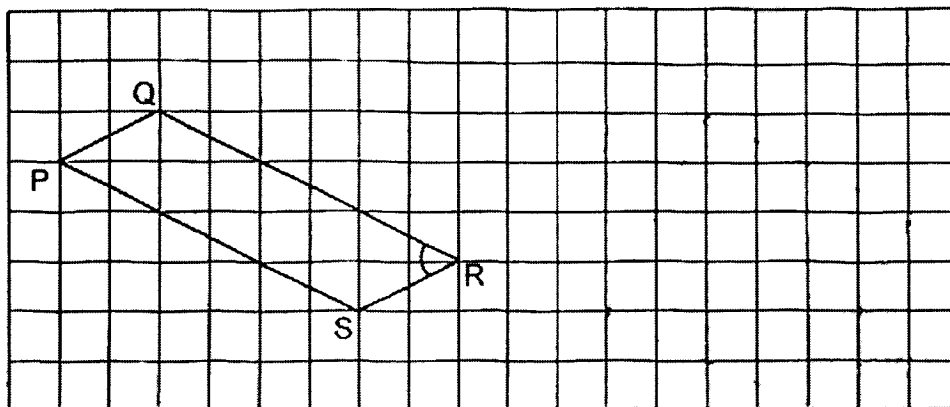
Maya's goal was to save an average of \$50 per month over 4 months. Based on her savings from January to March, how much must she save in April to meet her goal?

Do not write in this space

Month	Amount Maya Saved (\$)
January	42
February	45
March	55
April	?

Ans: \$ _____

4. A parallelogram PQRS is drawn on a square grid.

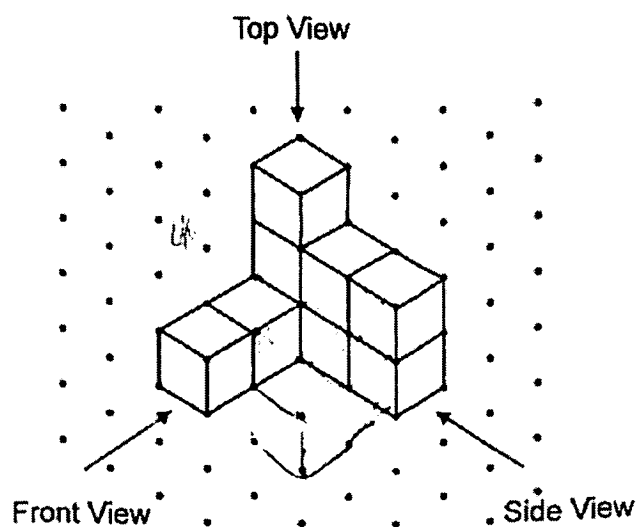


- (a) Measure $\angle QRS$.

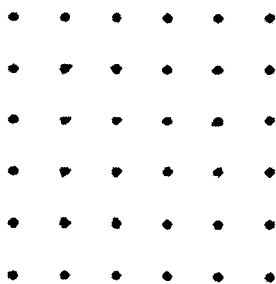
Ans: (a) _____°

- (b) On the square grid, draw a square that has the same perimeter as parallelogram PQRS. The square must not overlap parallelogram PQRS.

- 5 The solid below was formed using unit cubes.



- (a) Draw the top view on the grid.



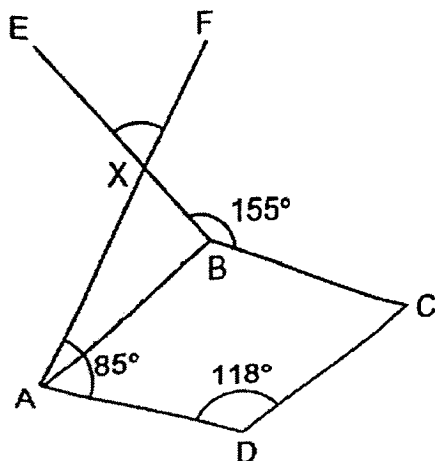
- (b) Some unit cubes were added to the solid. After that, only the front view and side view remained unchanged. Find the greatest number of unit cubes that were added.

Ans: (b) _____

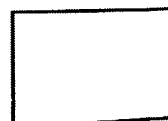
For questions 6 to 15, show your working clearly in the space provided for each question and write your answers in the spaces provided. The number of marks available is shown in brackets [] at the end of each question or part-question. (40 marks)

Do not write
in this space

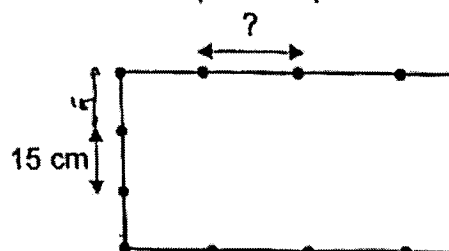
6. ABCD is a rhombus, AXF and BXE are straight lines. $\angle ADC = 118^\circ$, $\angle EBC = 155^\circ$ and $\angle XAD = 85^\circ$. Find $\angle EXF$.



Ans: _____ $^\circ$ [3]



7. The figure shows part of a rectangular board. The board has an area of 9450 cm^2 . A total of 30 pins are placed along its perimeter.



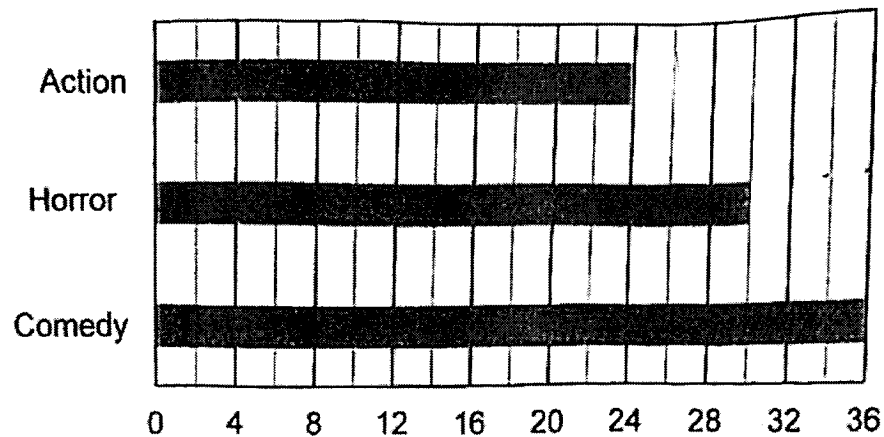
The pins along each breadth are placed at equal intervals of 15 cm. The pins along each length are also placed at equal intervals, but at a different distance. What is the distance between two consecutive pins along the length of the board?

Ans: _____ cm [3]



8. A group of pupils was asked to choose their favourite movie genre. Each pupil chose only one movie genre. The results are shown in the graph.

Do not write
in this space

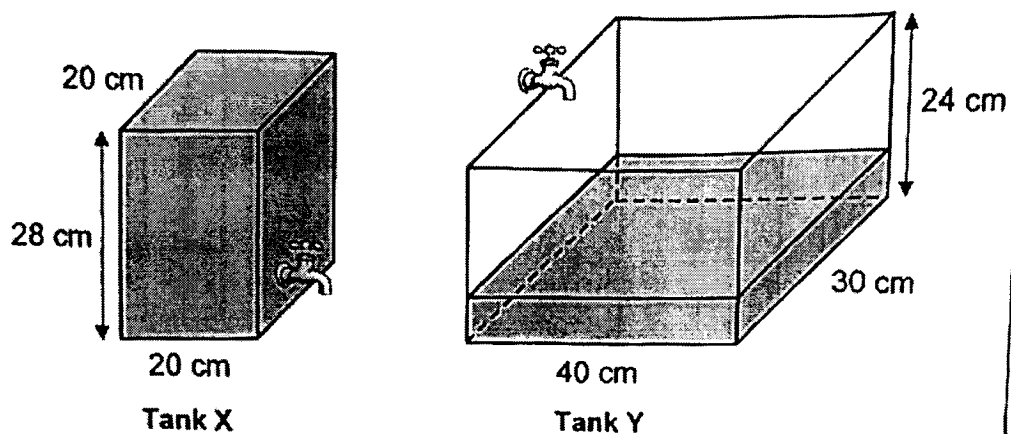


Ms Shanti then ordered a total of 1500 movie tickets for Action, Horror and Comedy films. The number of tickets ordered for each genre was in the same ratio as shown in the graph. During Movie Night, 75% of the Action tickets and 30% of the Comedy tickets were sold. How many tickets in total from these two genres were sold?

Ans: _____ [3]



9. Two rectangular tanks are shown. At first, Tank X was completely filled with water and $\frac{1}{3}$ of Tank Y was filled with water.



Both taps were turned on at the same time and water then flowed out of the tap at Tank X at a rate of 1.2 litres per minute. Water from the tap at Tank Y flowed in at a rate of 1.2 litres per minute. How long would it take for the height of the water to be the same in both tanks?

Ans: _____ min [4]



10. Mr Lim spent $\frac{3}{8}$ of his monthly salary on household expenses and medical fees. $\frac{4}{9}$ of the household expenses is equal to $\frac{2}{3}$ of the medical fees. He gave $\frac{2}{5}$ of his remaining salary to his mother and saved the rest. His mother received \$150 more than what he had spent on medical fees. How much did Mr Lim save from his monthly salary?

Do not write
in this space

Ans: \$ _____ [4]



11. Ms Lim bought a washing machine for \$459 after a discount of 15%. She also bought a vacuum cleaner for \$192. The total discount for the washing machine and the vacuum cleaner was \$129. What was the percentage discount for the vacuum cleaner?

Ans: _____% [4]

The table shows the prices of tickets for an exhibition.

Type	Category	Price
Adult	Standard	\$24
	Senior	\$15
Child	Student	\$9

Do not write
in this space

The number of standard adult tickets sold was 4 times the number of child tickets sold. The number of senior adult tickets sold was twice the number of child tickets sold.

- (a) For every child ticket sold, what was the total number of adult tickets sold?

Ans: (a) _____ [1]

- (b) A total of \$13 635 was collected from the sale of tickets. What was the total number of tickets sold?

Ans: (b) _____ [3]

13. A bookstore held a weekend promotion. All books sold were either hardcover or paperback, priced as follows:

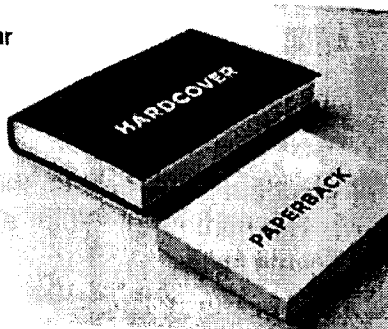
Choose your
book type!

HARDCOVER

\$38

PAPERBACK

\$15



- (a) In the morning session, the bookstore sold 130 paperback books. The total amount collected during the morning session was \$4610. What percentage of the money collected came from the sale of paperback books? Give your answer correct to 1 decimal place.

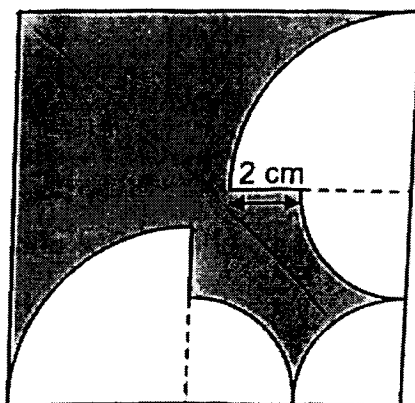
Ans: (a) _____ % [2]

- (b) In the afternoon session, the bookstore had sold a total of 150 books and collected \$3630. How many hardcover books were sold?

Ans: (b) _____ [3]

14. Ravi designed a logo on a square card of side 11 cm. The logo is made up of 3 identical small quarter circles and 2 identical big quarter circles.

Do not write
in this space



(Take $\pi = 3.14$)

- (a) What is the radius of the big quarter circle?

Ans: (a) _____ cm [2]

- (b) What is the perimeter of the shaded part?

Ans: (b) _____ cm [3]

15. The following figures are made up of square tiles. Each side of the tile is 1 cm. The first four figures of a pattern are shown below.

Do not write
in this space



Figure 1

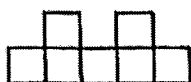


Figure 2

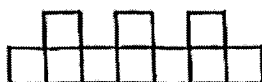


Figure 3



Figure 4

The table below shows the number of tiles and the perimeter of each figure.

Figure Number	1	2	3	4	5
Number of Tiles	4	7	10	13	
Perimeter (cm)	10	16	22	28	

[1]

(a) Fill in the table for Figure 5.

(b) Find the number of tiles for Figure 22.

Ans: (b) _____ [2]

(c) Which figure has a perimeter of 100 cm?

Ans: (c) _____ [2]

END OF PAPER 2

MARKING SCHEME / ANSWER KEY**PAPER 1 - BOOKLET A**

Question	1	2	3	4	5	6	7	8	9
Answer	3	2	1	4	3	4	1	3	2
Question	10	11	12	13	14	15	16	17	18
Answer	4	3	1	2	4	1	1	4	2

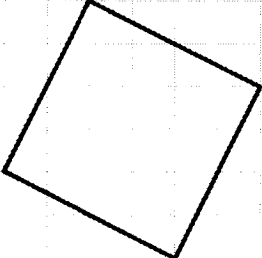
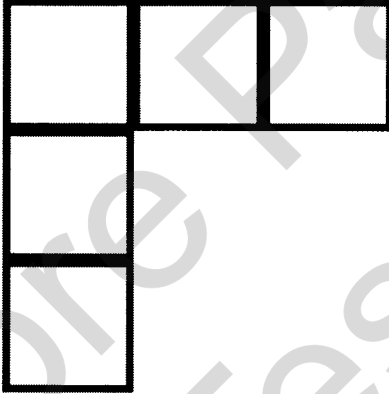
PAPER 1 - BOOKLET B

Q	Suggested working / answer
19	40 muffins = 5 groups of 8 muffins. Free muffins = $5 \times 2 = 10$ Price per muffin = $\$18 \div 10 = \1.80 ANS: \$1.80
20	Decrease = $300 - 165 = 135$ cm Percentage decrease = $135 \div 300 \times 100\% = 45\%$ ANS: 45%
21	Reflect each shaded triangle across AB. The four triangles to be added are marked with crosses. ANS: See completed symmetric grid.
22	Shaded area = $\frac{1}{2}$ circle + $\frac{1}{4}$ circle = $\frac{3}{4}$ circle $\frac{3}{4} \times 22 \div 7 \times 7 \times 7 = 115.5$ ANS: 115.5 cm²
23	Almonds : cashews = 13 : 7, so almonds + cashews = 20 units. Peanuts = $\frac{3}{4} \times 20 = 15$ units. ANS: 13 : 7 : 15

Q	Suggested working / answer
24	One block is 4, 0, 3, 1, 0. Its sum is 8 and it has two zeros. $303 = 37 \times 8 + 7$; the next terms 4, 0, 3 add 7 and contain one zero. Number of zeros = $37 \times 2 + 1 = 75$ ANS: 75
25	Fraction left = $1 - 1/12 - 1/4 = 2/3$ Number of boxes = $2/3 \div 1/6 = 4$ ANS: 4 boxes
26	Area of trapezium PRST = $1/2 \times (12 + 6) \times 6 = 54 \text{ cm}^2$. Area of triangle PQR = $54 - 42 = 12 \text{ cm}^2$. Triangles PRT and PST have the same base PT and height, and share triangle PQT. Hence triangle QST has the same area as triangle PQR. ANS: 12 cm^2
27	(a) Second shelf = $12w - 4w = 8w$ Third shelf = $8w + 40$ ANS: $8w + 40$ (b) $8w + 40 = 160$; $8w = 120$; $w = 15$ ANS: 15
28	Let Lindy have x stickers at first. Judy had $x + 16$. After the transfer: $x + 26 = 5(x - 10)$. $x + 26 = 5x - 50$; $4x = 76$; $x = 19$ ANS: 19 stickers
29	The bar heights are in the ratio $2 : 2 : 4 : 1$. $153 \div 9 = 17$ pupils per unit, so Cherry = $4 \times 17 = 68$. (a) True For Apple, Mango and Cherry, girls = boys. All 17 Grape pupils were boys. (b) False ANS: (a) True; (b) False
30	$AB = AD$ because triangle ABD is equilateral, and $AD = AE$. Hence $AB = AE$. Angle EAB = $60^\circ + 22^\circ = 82^\circ$. Angle ABE = $(180^\circ - 82^\circ) \div 2 = 49^\circ$. ANS: 49°

PAPER 2

Q	Suggested working / answer
1	Let the square side be s cm and the cuboid height be h cm. $s + 2h = 24.8$ and $2s + 2h = 40.8$. Subtracting gives $s = 16$; $16 + 2h = 24.8$; $h = 4.4$. ANS: 4.4 cm
2	Common factors of 16 and 24: 1, 2, 4 and 8 $1 + 2 + 4 + 8 = 15$ ANS: 15

Q	Suggested working / answer
3	Required total = $4 \times \\$50 = \\200 Saved from January to March = $42 + 45 + 55 = \\$142$ April saving = $200 - 142 = \\$58$ ANS: \$58
4	(a) Measuring the angle gives approximately 53°. ANS: 53° (b) A short side of PQRS moves 2 squares across and 1 square vertically. The long side is 3 times this length, so the square side is twice the short side. One valid square is shown. ANS: See drawing. 
5	(a) The top view has five squares in an L-shape. ANS: See drawing. (b) The front-view maximum heights are 3, 2, 2 and the side-view maximum heights are 3, 1, 1. Filling every possible hidden position gives 13 cubes. Original cubes = $3 + 2 + 2 + 1 + 1 = 9$. Greatest number added = $13 - 9 = 4$. ANS: 4 unit cubes 

Q	Suggested working / answer
6	Angle DAB = $180^\circ - 118^\circ = 62^\circ$. Angle XAB = $85^\circ - 62^\circ = 23^\circ$. Angle ABX = $360^\circ - 118^\circ - 155^\circ = 87^\circ$. Angle AXB = $180^\circ - 23^\circ - 87^\circ = 70^\circ$. Angle EXF is vertically opposite angle AXB. ANS: 70°
7	Breadth = $3 \times 15 = 45$ cm. Length = $9,450 \div 45 = 210$ cm. If there are n intervals on each length: $2n + 2(3) = 30$, so $n = 12$. Distance = $210 \div 12 = 17.5$ cm. ANS: 17.5 cm
8	Action : Horror : Comedy = $24 : 30 : 36 = 4 : 5 : 6$. Action tickets = $4/15 \times 1,500 = 400$; sold = $75\% \times 400 = 300$. Comedy tickets = $6/15 \times 1,500 = 600$; sold = $30\% \times 600 = 180$. Total sold = $300 + 180 = 480$. ANS: 480 tickets
9	Tank X base area = $20 \times 20 = 400$ cm²; its water height falls by $1,200 \div 400 = 3$ cm/min. Tank Y starts at $1/3 \times 24 = 8$ cm; its height rises by $1,200 \div (40 \times 30) = 1$ cm/min. $28 - 3t = 8 + t$; $4t = 20$; $t = 5$. ANS: 5 min

Q	Suggested working / answer
10	Household : medical = 3 : 2 because $\frac{4}{9}$ of household = $\frac{2}{3}$ of medical. Medical fees = $\frac{2}{5} \times \frac{3}{8} = \frac{3}{20}$ of salary. Mother received $\frac{2}{5} \times \frac{5}{8} = \frac{1}{4}$ of salary. Difference = $\frac{1}{4} - \frac{3}{20} = \frac{1}{10}$ of salary = \$150, so salary = \$1,500. Saved = $\frac{3}{5} \times \frac{5}{8} \times \$1,500 = \$562.50$. ANS: \$562.50
11	Washing-machine marked price = $\$459 \div 85\% = \540 . Its discount = $540 - 459 = \$81$. Vacuum-cleaner discount = $129 - 81 = \$48$. Vacuum-cleaner marked price = $192 + 48 = \$240$. Percentage discount = $48 \div 240 \times 100\% = 20\%$. ANS: 20%
12	Let the number of child tickets be 1 unit. (a) Adult tickets = $4 + 2 = 6$ units. ANS: 6 (b) Money for 7 tickets = $4(\$24) + 2(\$15) + \$9 = \135 . Number of groups = $13,635 \div 135 = 101$. Total tickets = $101 \times 7 = 707$. ANS: 707 tickets

Q	Suggested working / answer
13	(a) Paperback takings = $130 \times \\$15 = \\$1,950$. $1,950 \div 4,610 \times 100\% = 42.299\ldots\% = 42.3\%$ (1 d.p.) ANS: 42.3% (b) If all 150 books were paperback, takings = $150 \times \\$15 = \\$2,250$. Extra takings = $3,630 - 2,250 = \\$1,380$. Each hardcover adds $\\$38 - \\$15 = \\$23$. Hardcovers = $1,380 \div 23 = 60$. ANS: 60 hardcover books
14	(a) Let the small radius be r cm and the big radius be R cm. $R - r = 2$ and $R + 2r = 11$. Hence $r = 3$ and $R = 5$. ANS: 5 cm (b) Straight lengths = $11 + 11 + 2 + 2 = 26$ cm. Quarter-circle arcs = $\frac{1}{4} \times 2 \times 3.14 \times [2(5) + 3(3)] = 29.83$ cm. Perimeter = $26 + 29.83 = 55.83$ cm. ANS: 55.83 cm
15	Number of tiles increases by 3 each time: $T = 3n + 1$. Perimeter increases by 6 cm each time: $P = 6n + 4$. (a) Figure 5: $T = 16$, $P = 34$ cm. ANS: 16 tiles; 34 cm (b) Figure 22: $T = 3(22) + 1 = 67$. ANS: 67 tiles (c) $6n + 4 = 100$; $6n = 96$; $n = 16$. ANS: Figure 16